The Impact of Managed Care on Internal Medicine Graduate Medical Education at Brooke Army Medical Center

A Graduate Management Project
Submitted to:

Karin Zucker, J.D.
Professor, U.S. Army - Baylor University
Graduate Program in Health Care Administration

June 2000

MAJ Angela A. Koelsch, CHE
Administrative Resident
Brooke Army Medical Center
Fort Sam Houston, Texas 78234-6200
(210) 916-4393

Report Documentation Page

Report Date	Report Type	Dates Covered (from... to)
00 Aug 2000	N/A	-

Title and Subtitle The Impact of Managed Care on Internal Medicine Graduate Medical Education at Brooke Army Medical Center	**Contract Number**
	Grant Number
	Program Element Number
Author(s)	**Project Number**
	Task Number
	Work Unit Number
Performing Organization Name(s) and Address(es) Brooke Army Medical Center 3851 Roger Brooke Drive Fort Sam Houston, TX 78234-6200	**Performing Organization Report Number** 3-00
Sponsoring/Monitoring Agency Name(s) and Address(es)	**Sponsor/Monitor's Acronym(s)**
	Sponsor/Monitor's Report Number(s)
Distribution/Availability Statement Approved for public release, distribution unlimited	
Supplementary Notes	
Abstract	
Subject Terms	
Report Classification unclassified	**Classification of this page** unclassified
Classification of Abstract unclassified	**Limitation of Abstract** UU
Number of Pages 64	

ACKNOWLEDGMENTS

I would like to briefly express my gratitude to the many people who assisted me with this project. As always, I am thankful for my wonderful family and friends, who supported me each day with their love and encouragement, and for my incredibly patient and supportive husband, who provided me with a personal technical support hotline. I am grateful to my BAMC co-workers and Baylor Bear classmates for ensuring that each day of my residency was not only educational also lots of fun. I could not have completed this project without the help of countless others throughout BAMC who gave freely of their time and expertise. There are too many individuals to name, but I would like to acknowledge the Department of Medicine staff and GME consultants who guided me through a maze of clinical issues. I would like to recognize my Preceptor, Colonel Martin Fisher, for making this project possible by allowing me to research a topic of personal interest and giving me the time to devote to it. I would also like to extend a special thank you to Dr. Karin Zucker, LTC Dawn Smith, and LTC Sandra White for their helpfulness, insight, and many hours spent reviewing this project during its various stages.

ABSTRACT

Brooke Army Medical Center (BAMC) is a 450-bed tertiary care hospital with a multi-fold mission to provide comprehensive patient care, medical education, and research. The implementation of managed care has caused BAMC's focus to shift from an academic role to a primary care role, with increased emphasis on productivity and cost-effectiveness. Successfully balancing managed care programs and graduate medical education (GME) programs has been especially challenging because managed care goals are often inconsistent with the traditional goals of a specialty driven, academic teaching institution.

This project studied data on BAMC's Internal Medicine Residency Program (1993 – 1999) to identify changes attributable to implementation of managed care. Results showed both positive and negative impacts. It has increased the staff's focus on prevention and on their responsibility to provide a continuum of care to enrolled beneficiaries. This has had a positive influence on the procedure workload for internal medicine because it is a primary care service. However, research and workload data indicate that the environment for training and education is becoming more constrained. Since training and education are not goals directly aligned with managed care, they have taken a back seat to recent efforts that focus on productivity in primary care. Decreases in research and inpatient workload signal a decrease in the overall quality of medical education programs and may be a warning sign of more serious problems to come. It is likely that teaching, an inherently time-intensive and inefficient process, will suffer unless provided for in enrollment and productivity calculations.

BAMC must ensure that measures are in place not only to be productive and succeed in managed care, but also to maintain high quality GME. Recommendations include improving documentation, increasing GME visibility, evaluating surgical and subspecialty training programs, and maintaining a healthy balance between the immediate patient care mission and GME mission.

TABLE OF CONTENTS

List of Tables

List of Figures

Introduction

Conditions Which Prompted the Study (Background)

Brooke Army Medical Center (BAMC) is a state-of-the-art, 450-bed tertiary care hospital with a multi-fold mission to provide comprehensive patient care, medical education, and research. As one of the largest military medical centers, BAMC supports a daily census of over 100 inpatients, over 2000 daily outpatient visits, a world renown Institute of Surgical Research Burn Unit, and the Army's only Level I Trauma Center. BAMC also provides extensive medical training through 23 graduate medical education (GME) programs and a variety of clinical training programs for nurses, technicians, and medical students (BAMC Public Affairs Office, 1999).

Teaching hospitals, like BAMC, have traditionally maintained clinical excellence through their three-fold missions: GME, clinical and basic research, and a full spectrum of patient care (Iglehart, 1993). The education and research missions enhance the abilities of these academic medical centers (AMCs) to provide the most advanced and comprehensive patient care available. One drawback, however, is that the exceptional care received in academic medical centers is usually accompanied by longer lengths of stay, multiple consultations, liberal testing, and other inefficiencies resulting from the educational focus. This increased resource utilization translates to higher costs. For over 30 years these teaching costs have been accepted as an important "public good" and supported with Medicare funding for GME programs.

Today, the traditional roles and characteristics of teaching hospitals are conflicting with managed care. Academic medical centers' higher resource utilization and higher

costs directly contrast with managed care's emphasis on maximizing resource effectiveness and cost-containment. See Table 1 (Howard, 1994).

Table 1. Differences Between the Goals of Managed Care and Characteristics of Traditional Academic Medical Centers

Characteristics of Traditional Academic Medical Centers	Managed Care Goals
Resource-intensive patient care	Maximize resource effectiveness
Longer lengths of stay	Reduce lengths of stay
Multiple consultations, liberal testing	Minimize "unnecessary" tests
Specialist oriented	Emphasize primary care
Inpatient focus	Outpatient emphasis
Emphasis on technologic innovation	Judicial use of technology
Experimentation/innovation	Adhere to practice guidelines
Resident-driven patient care	Efficient practice patterns
Inefficient practice patterns	Central planning
Autonomy	

The Department of Defense (DoD) began to implement managed care (TRICARE) in October 1993. The intent of TRICARE was to improve beneficiary access and ensure quality of care while controlling healthcare costs (Department of Defense, 1994.) Under the managed care concept, patients are enrolled to primary care providers (PCPs) who manage their care. PCPs are responsible for all preventive care, disease management, and referrals to specialists. Providers in family practice/general medicine, internal medicine, pediatrics, emergency medicine, and obstetrics/gynecology are generally defined as primary care physicians (Kongstvedt, 1997).

BAMC began enrolling active duty beneficiaries in November 1995 and family members in 1996. Patients were enrolled to five primary care services: the Internal Medicine Clinic, Department of Pediatrics, Adult Primary Care Network Clinic, General Medicine Clinic (for active duty only), and Family Care Clinic. By 1999, BAMC's TRICARE Primary Care Providers supported an enrolled population of 34,936 beneficiaries by 1999 (Composite Health Care System, August 1999).

The military system has had difficulty implementing competitive managed care practices because of several unique conditions. First, providers have military duties that detract from their available clinic time. Several studies have shown that Department of Defense primary care providers are unavailable for patient care at least 10% of the time due to "specific cultural requirements" such as readiness training and deployments (Booz Allen & Hamilton, 1998). In addition, utilization data reveal that military beneficiaries use healthcare services up to 40% more than their civilian counterparts because of the availability of "free care" (Newhouse, 1993).

In addition, military healthcare has faced considerable funding scrutiny over the last several years. As budgets have been cut, healthcare managers have sought ways to maintain robust graduate education and medical readiness programs while implementing managed care initiatives (Gillert, 1997). Military medical center commanders, who traditionally focused on education, now must successfully manage both new managed care programs and traditional GME programs on increasingly tighter budgets. This is especially challenging because managed care goals such as minimizing costs and increasing productivity are often inconsistent with the traditional goals of a specialty driven, academic teaching institution like BAMC.

In recent years BAMC's focus has, of necessity, shifted from an academic role to a primary care role, with increased emphasis on productivity and cost-effectiveness. Staff physicians, clinic chiefs, and department chiefs throughout BAMC have repeatedly expressed concern over this change. The issue was specifically identified by the department chiefs as adversely impacting morale and was discussed with the medical center Commanding General on 9 November 1999. The departments chiefs were

concerned that BAMC management had become too focused on the business aspects of managed care. They felt strongly that GME is a critical mission that was suffering and needed attention. The Deputy Commander for Clinical Services requested that this study focus on the Internal Medicine Residency Program (G. Ripple, personal communication, 10 November, 1999). Internal Medicine is the logical focal point for a study on GME in a managed care environment because it is the only service that combines a GME program with an adult primary care mission.

At this time, very little consolidated data are available on BAMC's GME programs. The only information available in the literature consists of attitude surveys showing a negative attitude toward managed care among residents and staff physicians (Simon, Pan, Sullivan, Clark-Chiarelli, Connelly, Peters, Singer, Inui, and Block, 1999). In fact, a survey of military internal medicine residents revealed that most feel skeptical that GME will remain important in the future (Salerno, Cash, Cranston, & Schoomaker, 1998). Additional data on the GME program are scattered throughout BAMC in various minutes from meetings, audit reports, and historical files. Consolidation and analysis of objective data may render valuable information on BAMC's GME programs over the last several years. Analysis of Internal Medicine Residency Program data from 1993 –1999 would document any changes in our educational program resulting from implementation of TRICARE and TRICARE Senior Prime at BAMC. It may also lend insight into the relationship between our medical education and managed care systems. This analysis of one GME program over time is an important first step toward determining and understanding any impact TRICARE has had on BAMC's overall educational mission to date. It may also provide tools to aid in predicting the future impact of management

decisions as they affect our GME programs. This knowledge will help BAMC leadership balance two important missions that appear to have conflicting goals. As long as both missions continue, BAMC management will be challenged to ensure the mutual success of both GME and TRICARE at BAMC.

Statement of the Research Question

The research question for this study is "What impact has managed care (TRICARE) had on internal medicine GME at BAMC between 1994 and 1999?"

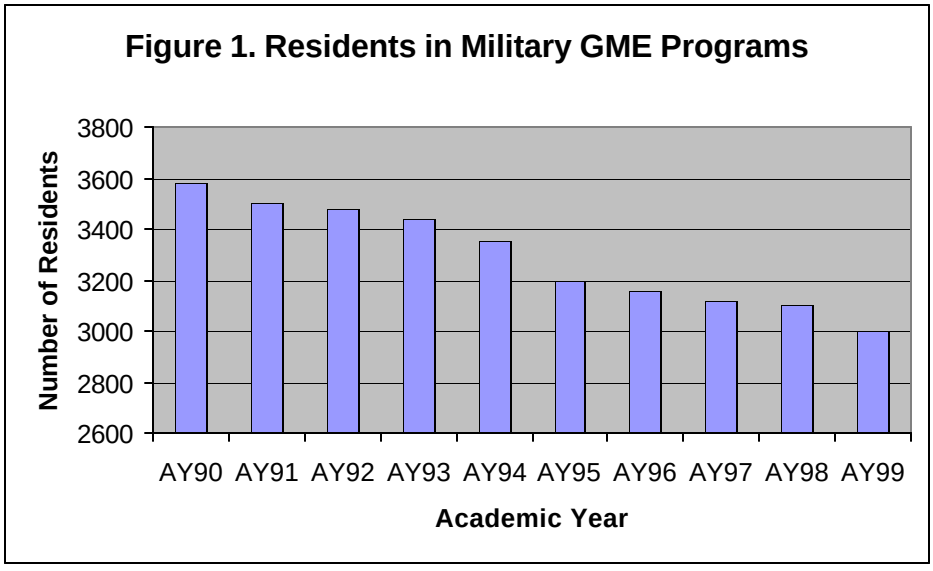
Literature Review

Physician training in the U.S. consists of four years of undergraduate medical education followed by three to seven years of clinical residency training that usually leads to certification in a medical specialty or subspecialty. Graduate medical education (GME) is time honored as an essential part of medical education that is commonly perceived as a public good, contributing to a better quality of care. Teaching hospitals are routinely perceived as the best hospitals in America because of their comprehensive range of specialty services and staff of subject matter experts (U.S. News and World Report, 1997). Studies have shown that U.S. teaching hospitals boast shorter lengths of stay and lower risk-adjusted mortality than non-teaching hospitals (Rosenthal, 1997).

Medical education has been an integral part of the military healthcare system for many years. The Department of Defense relies on military academic medical centers not only to contribute to medical excellence through training and research but also to provide an important source of trained military staff physicians. The quality of military GME

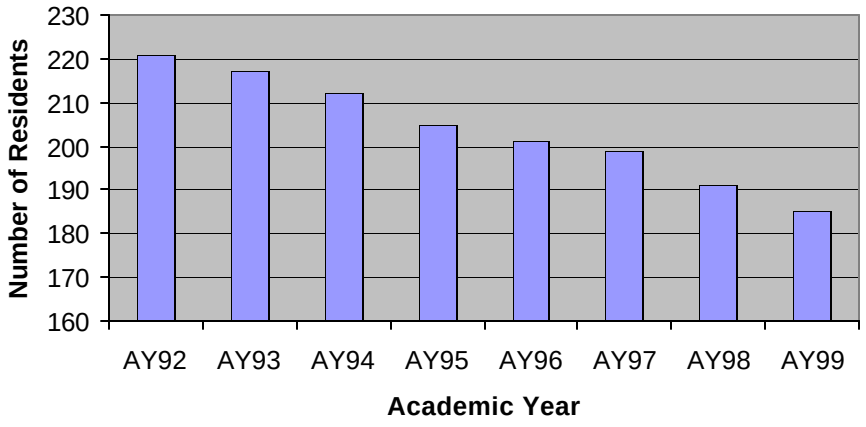
programs has routinely attracted a steady stream of top medical students and retained essential numbers of talented staff physicians for full military careers (Huntsinger, 1999). Retaining trained physicians is critical because it helps the military maintain both combat and peacetime readiness. Residents who have been trained in military GME programs become staff physicians that are not only trained to excel in their challenging combat mission but are also accustomed to the military environment. At a cost of approximately one percent of the annual military healthcare budget, GME has been considered a very sound investment with an important payoff (Gillert, 1997).

The Department of Defense has one of the largest GME systems in America, with approximately 3000 residents participating each year. The military's strong support of GME peaked in 1990, with 3580 residents. However, the numbers have been steadily decreasing since then due to budget cuts and downsizing of the military. See Figure 1 (Burkhalter, 1996).



The number of Army residents dropped 26% between 1993 and 1999. Army GME was reduced, primarily by eliminating programs, as military teaching hospitals either closed or were reduced from medical centers to community hospitals. As a result, the number of Army programs decreased 19 % in six years, from 177 programs in 1993 to 143 programs in 1999 (Raines, 2000). The reductions left fewer military teaching hospitals, as well as fewer residents at each remaining academic medical center (Army GME Office, 1999). For example, BAMC's GME program dropped from 221 residents in 1992 to 185 residents in 1999. See Figure 2 (BAMC GME Office, 1999).

Figure 2. Residents in BAMC GME Programs



As the military reduces the number of GME programs, each institution is responsible for ensuring that the remaining programs have the appropriate resources and the required number of supporting programs to provide a complete and quality educational experience for the residents. Most importantly, each institution must ensure that all GME programs continue to meet the specific requirements set by the American Council for Graduate Medical Education (ACGME). For example, the Council requires that an orthopedic

residency have associated internal medicine and general surgery residency programs (Burkhalter, 1996).

In this era of cost-containment, managing medical education programs is difficult because the costs remain elusive. Teaching, by nature, is expensive and inefficient compared to patient care. However, the exact costs of GME are unknown. As far back as the 1950s, scholars have struggled with determining the costs of GME. Multiple studies have compared total operational costs of academic medical centers to those of non-teaching hospitals. Results have shown that teaching hospitals consistently have higher costs and lower profit margins than community hospitals (Inglehart, 1993). An Institute of Medicine study demonstrated that teaching hospitals cost 28% more than non-teaching hospitals in this country" (United States Congress, 1999). Other studies have shown academic medical centers to be 44% more expensive and other teaching hospitals 14% more costly than non-teaching hospitals (Mechanic, 1998). As one physician explained in his testimony to Congress, "The old rule of training was: see one, do one, teach one. It is a very inefficient, hands-on system by which you train physicians. If efficiency becomes the whole focus of what is happening here, you have a whole different goal for a medical school" (United States Congress, 1999). Some say that medical education, by its very nature, does not allow teaching hospitals to be efficient in terms of seeing the most patients in the shortest time (Ludmerer, 1999).

However, there are also many advocates of reforming GME to emphasize teaching in ambulatory settings, providing cost-effective care, and increasing productivity (Kuttner, 1999). Advocates of GME reform also stress that it must increase the focus on managed care principles such as preventing and minimizing unnecessary or marginally beneficial

services. Heightened emphasis on primary care and preventive services will ultimately reduce the need for inpatient care. Therefore, the more successful managed care becomes, the fewer the inpatients will be available for training purposes. Additionally, shorter lengths of stay will mean less time for residents to monitor patients and observe outcomes as part of the learning process. Since most GME is conducted in inpatient settings, reduced admissions and reduced lengths of stay will undoubtedly have a negative impact on residency training in the long run unless programs are adapted to include more training in outpatient care settings (Grimaldi, 1998).

Accurate data for GME costs are not only necessary for managers to make cost-effective health care and budgeting decisions; they are also required for facilities participating in the TRICARE Senior Prime Demonstration Project. Federal law requires the Department of Defense to determine its actual expenses for treating the Medicare eligible population and to adjust reimbursement rates for GME program costs (DoD IG Audit, 1997). Unfortunately, very little consolidated data are available to help managers make decisions involving GME programs. The majority of educational products, such as teaching, publishing, and research, are not reimbursed. Therefore, the number of publications and research reports is tracked only at the program level where this information is used to support accreditation. To make matters more difficult, educational costs are very difficult to separate from total patient care costs. This is also complicated by the fact that most military GME data are not very reliable. A 1997 Department of Defense Inspector General's report audited the Military Expense Performance Reporting System (MEPRS) data in the GME Support and the Student Salary Expenses Accounts. The findings show that DoD medical centers did not accurately and consistently report

GME program costs in FY95. For example, the average support cost per GME student ranged from $634 to $17,897 at the 15 medical centers audited. The average student salary expense allocation ranged from $18,035 to $81, 853. The study also revealed that MEPRS did not provide specific guidance for allocating the salaries of staff involved in GME and that 76% of the GME program directors had not allocated any of their salary to the GME support account.

Continued budgetary constraints have prompted the federal government to sponsor studies scrutinizing the size of residency programs with the intent of scaling back GME and reducing the government's responsibility for funding through Medicare (United States Congress, 1999). Similarly, the Department of Defense is still discussing downsizing and consolidation of programs with no end in sight. Therefore, academic health centers, both military and civilian, need to become more efficient and accountable in today's cost-conscious managed care environment

Without reliable costing methods, other tools must be used to make decisions on the proper management of educational programs. Unfortunately, only limited information is available in the literature. The majority of recent articles published on managed care in academic medicine focus on the reimbursement mechanisms, specifically federal reimbursement, for treating Medicare patients. Others have documented the attitudes of medical staff and students through surveys. They have shown, not surprisingly, that medical school faculty members and residency training directors are among the most powerful influences on students' views. They have also shown that 50% of medical students and residents could identify no positive influences on their attitudes toward managed care, but 70% identified negative influences (Michels, 1999). Others have

shown that managed care has decreased time for research and teaching (Simon, Pan, Sullivan, Clark-Chiarelli, Connely, Peters, Singer, Inui, & Block, 1993). When the military healthcare system is challenged to balance and integrate managed care practices with GME programs, these results are disturbing.

According to a recently published book detailing the history of medical education, the pressures of managed care have "wreaked havoc on the learning environment of academic health centers, whose quintessential feature has always been that it allowed students and house officers enough time with patients for educational objectives to be met" (Ludmerer, 1999). The first step in determining if managed care has "wreaked havoc" on BAMC GME is to gather and analyze objective data on how GME programs have performed during the time period when managed care (TRICARE) was implemented in the Military Health System. Recent budget cuts in the civilian world have made it critical for professional organizations to "monitor GME tracking data more systematically and accurately than every before" (Dunn, Miller, & Richter, 1988). Similarly, military organizations have a responsibility to do the same.

Purpose.

The purpose of this study was to provide insight that will assist in the evaluation of BAMC's Internal Medicine Residency Program. Specifically, it will provide a better understanding of the potential impact of management decisions such as staffing, funding, and organizational changes as they relate to GME. Identifying significant changes in this academic primary care program will provide BAMC leadership and program managers objective information that will help them better understand GME as it relates to

TRICARE. This information will aid decision-makers in their efforts to successfully balance the managed care and educational missions.

Method and Procedures

Goals and Objectives

The goal of this research was to determine the impact of TRICARE on BAMC's internal medicine GME between 1994 and 1999. Changes in both clinical workload and educational productivity were researched because both are important to providing an appropriate educational experience for residents. Clinical workload was measured by outpatient clinic visits, occupied bed days, and dispositions. Educational productivity was measured primarily by the number of times each required medical procedure was performed by each resident prior to graduation. Impact on the GME program was determined by identifying significant differences between graduating classes in the average number of procedures performed per resident. The number of first time passes on board certification exams and the number of papers, presentations, and abstracts were also researched and evaluated as additional measures of educational performance.

Research was conducted in two main phases. The first phase consisted of data collection and documentation of national and local requirements for internal medicine GME programs. The goal of the first phase was to gain an in-depth understanding of the GME system and to gather pertinent data to reflect the Department of Medicine's clinical environment and the Internal Medicine Program's educational products from 1994 to 1999. The second phase consisted of data analysis to identify any changes in clinical workload or educational products over the same time period. The primary goal for the second phase was to determine if there were any significant differences in the average number of procedures performed per internal medicine residency graduating class after implementing TRICARE at BAMC. An additional goal for the second phase was to

identify trends in clinical workload and research products to further document and evaluate any impact on GME during that timeframe.

Objectives for phase one included gathering background data on GME structural and regulatory issues as well as gathering workload and procedure data from 1994-1999. Required data were gathered from a wide variety of sources, including literature reviews, personal interviews with staff members and residents, clinical and financial information systems, and historical files. The following areas were investigated as they related to the Internal Medicine Residency Program between 1994-1999.

1. Graduate Medical Education Program Accreditation Requirements.
   Source: ACGME publications.
2. Individual Board Certification Requirements.
   Source: American Board of Internal Medicine publications.
3. BAMC Internal Medicine Residency Program Structure and Requirements.
   Sources: Internal Medicine Residency Program Curriculum, personal observations, and interviews with staff physicians and residents.
4. Medical Procedures Performed Per Resident.
   Sources: Department of Medicine procedure sheets submitted by each resident between 1993 and 1999 and maintained in Department of Medicine procedure files, Chief Medical Resident records and historical procedure database printouts.
5. Research Products. Research products are defined as the number of publications, presentations, and abstracts produced by both staff physicians and residents.

Source: Department of Clinical Investigations Annual Research Reports, 1993-1999.

6. Clinical Workload Data for BAMC and Department of Medicine. Inpatient workload was measured by the number of dispositions and occupied bed days. Outpatient workload was measured by the number of outpatient clinic visits.

   Source: Ad hoc queries from the Composite Health Care System (CHCS) and historical Resource Management Division, Military Expense Reporting System (MEPRS) workload reports.

Objectives for phase two included data entry and analysis. Clinical workload data and research data were entered onto Excel spreadsheets and graphed. Descriptive statistics were used to identify the mean values, standard deviations and percent change between 1994 and 1999. All clinical workload was documented by fiscal year. For example, the 1994 data includes October 1993 through September 1994.

Procedure data required more extensive data collection and analysis. Procedure data were reported by graduating class. Data for a given year include a total number of procedures for each resident graduating in that particular year. The total for each resident includes all procedures performed during the three-year residency. The following tasks were performed on the procedure data: 1) data entry, 2) data inspection and cleanup, 3) internal medicine data analysis, 4) review, 5) revised analysis, and 6) subspecialty analysis.

Data entry consisted of manually entering data from individual procedure sheets into an Access database with the following fields: resident last name, resident class, procedure

name, date performed, patient name, patient social security number, and other physicians in attendance. The initial database included over 12,000 records. At the advice of Department of Medicine staff, entries of the same procedure performed on the same patient by the same physicians on the same day were considered to be duplicate entries. After eliminating duplicate entries from the database, the number of records was reduced to 10,000 documented procedures.

At this point, the data still required inspection and cleanup prior to analysis. Data for each year were inspected for completeness and the database entries were limited to include only residents who completed the entire three-year residency program (N=57) and only those required and/or recommended procedures that were consistently tracked for the graduating classes of 1994 through 1999 (N=12). Residents were identified from Department of Medicine historical rosters and interviews with staff physicians. Partial printouts from various historical databases were only available to validate procedure data from academic years 1994 and 1995. After consulting with the Program Director and Chief Medical Resident, data from 1998 and 1999 were determined to be incomplete. Therefore, the data for those two years were substituted with data from a spreadsheet maintained by the Chief Medical Resident. Procedure totals were determined by adding all procedures performed during each student's three-year residency. Residents were then grouped by graduating class, so the procedure data for each year reflect the total procedures performed by each resident graduating that year. The final database will be referred to simply as the Procedure Database from this point forward.

Statistical analyses were then conducted on the final Procedure Database. Descriptive statistics, such as the means and standard deviations, for each procedure were

determined first. The average number of each procedure for each graduating class was graphed to look for obvious trends. A one-way analysis of variance (ANOVA) was performed for each procedure using SPSS statistical software to determine if there were any significant differences among years in the number of procedures performed by residents. The null hypothesis tested was that there was no difference in the number of procedures performed as a function of year. The independent variable for this analysis was the year and the dependent variable was the number of procedures performed by each resident for that graduating class. For example, the 1995 procedure data include the total number of each procedure performed by each resident in the graduating class of 1995. The number would include procedures performed and documented during that student's entire residency, from July 1992- June 1995 (Academic Years 1992-1993, 1993-1994, and 1994-1995). There is no data overlap between years because each resident is only part of one graduating class. Significance was determined at the 0.05 level.

Subject matter experts were consulted and asked to review methods and results at regular intervals. The Chief Medical Resident reviewed procedure data for completeness and the Department of Medicine Program Director reviewed the procedure totals, results, and conclusions for validity and reasonableness.

As a result of this review, the statistical analysis was revised. The initial statistical analysis determined a significant difference in data for the graduating classes of 1996 and 1997 compared to all other years. Interviews with staff members and physicians who were residents during those years cast doubt on the completeness of recorded data due to poor record keeping. Some of the other workload measures also displayed a decrease in

fiscal year 1996 and 1997 data. It is commonly believed that the decreased workload during this timeframe does not reflect an actual decrease in patient care, but rather is the result of poor record keeping during the hospital's move into a new facility in 1996. After conferring with the Chief Medical Resident and the Program Director, it was decided that the statistical analysis would be repeated comparing only 1995, 1998, and 1999 data. This allowed for a direct comparison of the final pre-managed care year (1995), an established TRICARE year (1998), and the first year of TRICARE Senior Prime (1999). These years will be referred to as Pre-TRICARE, TRICARE, and TRICARE Senior Prime from this point forward.

As a point of comparison, data from one subspecialty were analyzed using the same methods as in the internal medicine data analysis. Procedure data from the Gastroenterology Fellowship Program was analyzed to test the null hypothesis that there was no difference in the number of fellow procedures performed as a function of year. This analysis was added to investigate staff beliefs that the subspecialty training may be impacted more by managed care than the primary care focused internal medicine residency training. Procedure data from gastroenterology fellows was collected and analyzed in the same way as residency procedure data analysis described above.

Reliability and Validity

Reliability is the ability of the model to consistently measure what it is designed to measure (Cooper, Schindler, 1998). The most difficult question of reliability in this project concerned the residents' procedure data. There was considerable question about the reliability of workload attribution between residents and staff physicians in our

clinical databases. The data systems are not designed to distinguish between staff physician and resident workload. The field containing the physician's name may list either the staff physician or the resident's name. Also, residents often share procedures with staff physicians and other students, but only one name can be listed. Therefore, a staff physician or resident's work is not always attributed to them in our information systems. Since no reliable automated system is in place to document workload credit for residents, individual procedure logs were determined to be the most accurate source for internal medicine resident procedure data. However, the required format for procedure reporting and the degree of enforcement changed several times between 1994 and 1999. Data for some years appeared to be more reliable for some years than for others. Therefore, whenever possible, data were validated by comparing each entry from the data sheets to the same entries in printouts from old databases. Also, as discussed in the methods section, the procedure totals for each resident were reviewed by the Department of Medicine Chief Resident and Program Director. These subject matter experts both concluded that the data from the classes of 1996 and 1997 was the least reliable and supported not using these data in the final statistical analysis. In addition, a small sampling of random audits was performed to confirm the self-reported procedure data including the physician's name, date, and procedure performed in the appropriate patient's medical records. A few minor discrepancies in dates were found, but overall, the self-reported data was found to be accurate.

Military Expense Reporting System (MEPRS) workload data validity has recently been an issue of concern for the entire Army Medical Department. With the implementation of the TRICARE Senior Prime Medicare Demonstration Project, the

resource management staff has been challenged to validate MEPRS data so the Commander can certify it as correct. As a result of these efforts, data from 1999 is believed to reflect a higher level of accuracy than in previous years. However, there is still considerable concern over the quality of data input at the service level which can impact on the quality of summary workload data subsequently reported.

When appropriate, subject matter experts reviewed all methods, assumptions, data and conclusions pertaining to this study to increase face validity.

Limitations and Assumptions

This study was limited to the impact of TRICARE implementation on the BAMC Internal Medicine Residency Program and the Gastroenterology Fellowship Program. Limiting the scope of the project reduced the external validity of the conclusions and recommendations. Therefore, findings must be individually evaluated to determine if they are more broadly applicable to other residency or fellowship programs.

This analysis also did not attempt to quantify the quality of patient care. The study assumed that a very high quality of patient care was provided throughout the period of study. This assumption was reinforced by BAMC's high resident pass rates on board exams, routine quality assurance checks, and continued high patient satisfaction scores.

This study also assumed that the available data were accurate. This means that the data accurately reflect work performed and properly documented in departmental records. However, the study was limited in the completeness of data. In many cases, historical workload data were not available for more than the last three years. Therefore, the majority of the workload data presented begin in 1996. Every reasonable attempt was

made to find and include all necessary procedure data. However, as discussed earlier, the procedural data are not believed to be complete for all years. Electronic databases were kept at various times over the last ten years, but had all been lost by the time of this study. Some of the entries on hand-written procedure sheets were incomplete or illegible. For reasons discussed in the methods section, 1996 and 1997 procedure data were determined to be incomplete and were not considered in final statistical analysis. Detailed dates and patient names were not available for 1998 and 1999 procedure data. Therefore, this information was not validated, but was assumed to be correctly documented by the residents on the honor system and submitted in its entirety.

Another limitation of this study was that costs were not evaluated. Although cost is an important factor in evaluating any program, there is no reliable system in place to measure the cost of GME. The Department of Defense Military Expense Reporting System (MEPRS) records manpower, performance, and expense data for fixed facilities (Department of Defense, 1991). This reporting system does a marginal job of capturing direct costs and was not designed to effectively capture indirect costs. Government audits have reflected that military GME data are inconsistent and unreliable.

Many additional factors directly indirectly impact on GME but were considered to be outside the scope of this study. Examples of factors not considered in this analysis include the following: downsizing, increased operational tempo, budget reductions, capitation incentives, the increasing cost of healthcare, and changing patient demographics.

Ethical Considerations

Confidentiality is the most important ethical consideration for this study. A significant number of the raw data sources used contained patient and physician names, social security numbers, and other confidential information. Data sheets containing confidential information were safeguarded by being kept in confidential file folders and were returned to Department of Medicine secured files when no longer needed for the study. All reasonable measures were taken to protect the privacy of patients. The use of patient names and social security numbers was necessary to validate patient encounters. However, once confirmed, this confidential information was hidden in all spreadsheets and eliminated from all final summaries and data analysis spreadsheets. All reported information is presented in aggregate numbers without means to identify individual patients or physicians. For example, resident productivity data is reported simply as an average per graduating class.

Results

Results for this study are presented in three sections. The first documents GME requirements at the national and program levels; the second provides clinical workload data from 1995-1999; and the third presents educational productivity data from 1994-1999. The clinical workload data show that while the inpatient admissions have decreased the outpatient workload for the Department of Medicine and the Internal Medicine Clinic has steadily increased from 1995-1999. Educational productivity, as measured by the number of required procedures performed, shows that the mean of most procedures performed has consistently exceeded American Board of Internal Medicine local residency program curriculum requirements. Additionally, the overall number of procedures performed per resident is not significantly different in 1999 from the number of procedures performed prior to implementation of TRICARE in 1995. Although overall research products for BAMC have declined in recent years, the Department of Medicine Residency Program has made positive improvements in this area, increasing the number of presentations between 1995 and 1999. As an external measure, American Board of Internal Medicine Board Pass rates have remained above national averages for all but one year.

Program Requirements

a. Program Accreditation Requirements. All GME programs are accredited by the Accreditation Council for Graduate Medical Education (often noted in publications as ACGME), which is sponsored by the American Board of Medical Specialties, the American Hospital Association, the American Medical Association, the Association of

American Medical Colleges, and the Council of Medical Specialty Societies. The Accreditation Council for Graduate Medical Education establishes national standards for GME and continually assesses programs through residency review committees (RRCs). The review committees inspect each program and accredit, for three to five years, those that meet the established standards for institutional and program requirements. Program requirements specify essential educational content, instructional activities, responsibilities for patient care and supervision, and the necessary facilities for accredited programs in a particular specialty. For example, institutions are required to have a graduate medical education committee that meets quarterly and has responsibilities ranging from regularly reviewing all residency programs to assuring that the curriculum includes a regular review of ethical, socioeconomic, medical/legal, and cost-containment issues that affect GME and medical practices (AMA 1999).

b. Individual Board Certification Requirements. Certification is the process for determining whether an individual physician has met established requirements within a particular specialty (AMA, 1999). The American Board of Internal Medicine, referred to as "the Board" determines the standards for internal medicine certification. The Board is a private, non-profit organization that establishes training requirements, assesses candidates' credentials, obtains substantiation of clinical competence, and develops and conducts examinations for certification and re-certification (ABIM, 2000). To be eligible for certification, physicians must participate in 26 months of full-time medical residency education including several months of general internal medicine training and up to four months of training in other primary care areas. Residents must also receive a satisfactory rating from program directors in overall clinical competence, humanistic qualities, and

ethical behavior in each year of training. At the conclusion of training in internal medicine, each resident must be judged by the program director to be proficient in the procedures listed below.

Although the Board does not prescribe an absolute number of times a procedure must be performed to assure competence, it has developed guidelines (indicated in parentheses) for the minimum number of directly supervised, successfully performed procedures that must be performed to demonstrate proficiency (See Appendix B for descriptions of each):

- Abdominal paracentesis (3)
- Arterial puncture for blood gas analysis (5)
- Arthrocentesis of the knee joint (3)
- Central venous line placement (5)
- Lumbar puncture (5)
- Nasogastric intubation (3)
- Thoracentesis (5)
- Critical life-saving procedures (this requirement can be met by documentation of successful training in advanced cardiac life support)
- Breast examinations (5)
- Rectal examinations (5)
- Pelvic examinations and pap smear, including wet mount (5).

In addition to the primary certificate in internal medicine, the Board offers subspecialty certificates in areas such as cardiovascular disease and gastroenterology. Physicians who are awarded a certificate in a subspecialty or area of added qualifications must have been previously certified in internal medicine by the Board, completed the requisite training, demonstrated clinical competence in the care of patients, and passed the subspecialty examination. For example, requirements for the subspecialty of gastroenterology include 36 months of total training with 18 months dedicated to clinical training. Proficiency is required in the following procedures: proctoscopy and/or flexible

sigmoidoscopy, diagnostic upper gastrointestinal endoscopy, colonoscopy, esophageal dilation, therapeutic upper and lower gastrointestinal endoscopy, and liver biopsy. The Board requires verification of the subspecialty fellows' clinical competence from both the director of the subspecialty training program and the chair of the Department of Medicine. All fellows must receive a satisfactory rating of overall clinical competence, humanistic qualities, and ethical behavior in each of the required years of training (ABIM, 2000).

c. Department of Medicine Residency Program. The Residency Program Director at each institution makes the final determination of specific program requirements so they may be tailored to the institution, mission, and patient population characteristics. The BAMC Internal Medicine Residency Program Curriculum details the program requirements and responsibilities of residents as well as staff. The three-year residency program averages about ten students per class, with approximately 30 residents in training at one time. The curriculum addresses procedures, research, clinical rotations, and lectures. The major sections focus on training rounds (39 four-week blocks in various departments to include primary care and subspecialty care areas), outpatient care (four hours each week in the Internal Medicine Clinic), patient-tracking responsibilities, procedural training requirements, and an academic program that includes in-training exams, seminars and research projects (Department of Medicine, 1999). The curriculum is designed to integrate structured, didactic learning with a well-rounded patient care experience. Close supervision is required at entry levels, but residents take on progressively greater responsibility as they gain clinical experience. Generally, junior residents (2nd year) begin by performing procedures under close supervision, but, by the

end of the senior year (3rd year), residents are performing most procedures independently. The following is a list of procedures required by the Internal Medicine Residency Curriculum, with the minimum number that must be performed to demonstrate proficiency indicated in parentheses (Department of Medicine, 1999):

- Abdominal paracentesis (5)
- Thoracentesis (5)
- Central venous line placement (10)
- Treadmill exercise testing (10)
- Endotracheal intubation (10)
- Arthrocentesis of the knee (1)
- Lumbar puncture (5)
- Arterial line placement (5)
- Swan Ganz catheter placement (5)
- Nasogastric intubation (5)

In addition, the following procedures are encouraged:

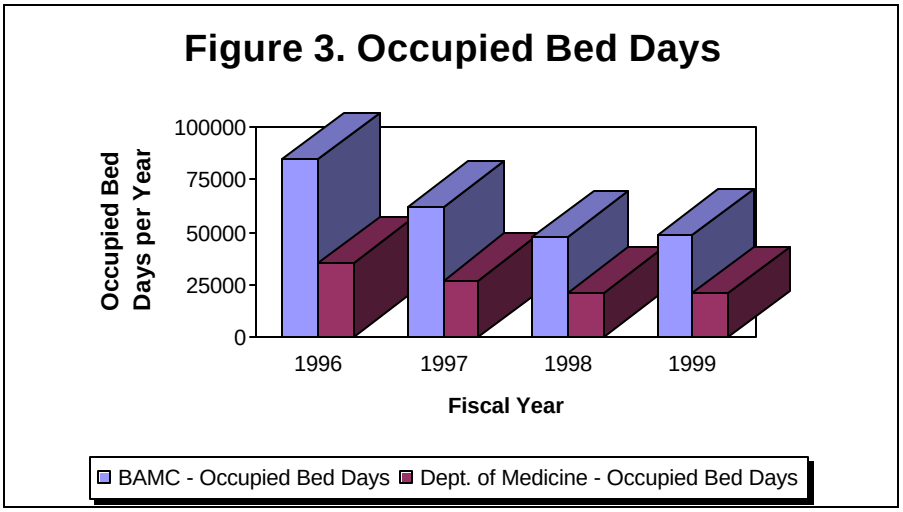
- Temporary pacemaker placement (5)
- Fitting vaginal diaphragms (5)
- Bone marrow aspiration and biopsy (5)
- Flexible sigmoidoscopy (15)

d. Gastroenterology Procedure Requirements. For certification in their subspecialty, gastroenterology fellows demonstrate competence by performing a minimum number (noted in parenthesis) of the following procedures (Department of Medicine, 1999):

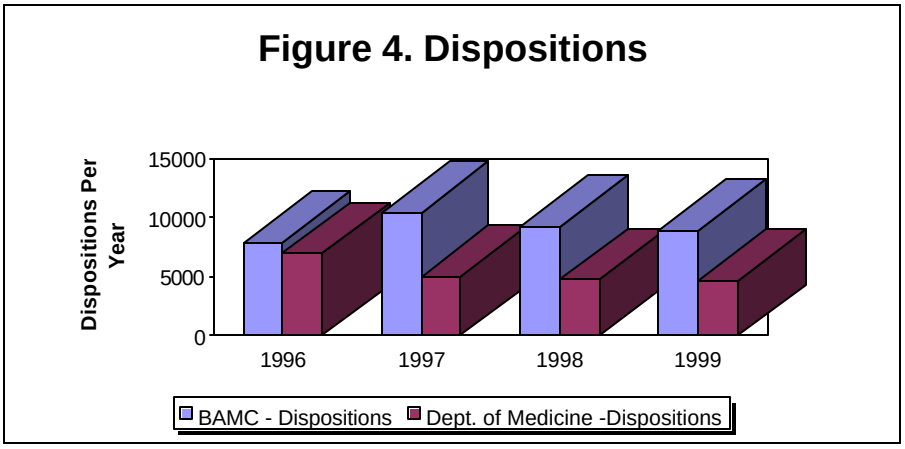
- Esophagogastroduodenoscopy (100)
- Esophageal dilations (50)
- Flexible sigmoidoscopy (25)
- Colonoscopy with polypectomy
  (minimum of 100 supervised colonoscopies and 20 supervised polypectomies)
- Percutaneous liver biopsy (20)
- Percutaneous endoscopic gastrostomy (10)
- Non-variceal hemostasis (20)
- Variceal hemostasis (15)

Workload Data.

As discussed in the methods section, all workload data were reported by fiscal year. Inpatient workload data for both BAMC and its Department of Medicine indicate an overall downward trend. Occupied bed days decreased 43% and 39%, respectively, between 1996 and 1999. BAMC's dispositions overall have remained fairly consistent, however, dispositions for the Department of Medicine fell 30% between 1996 and 1999 (MEPRS, 1999).

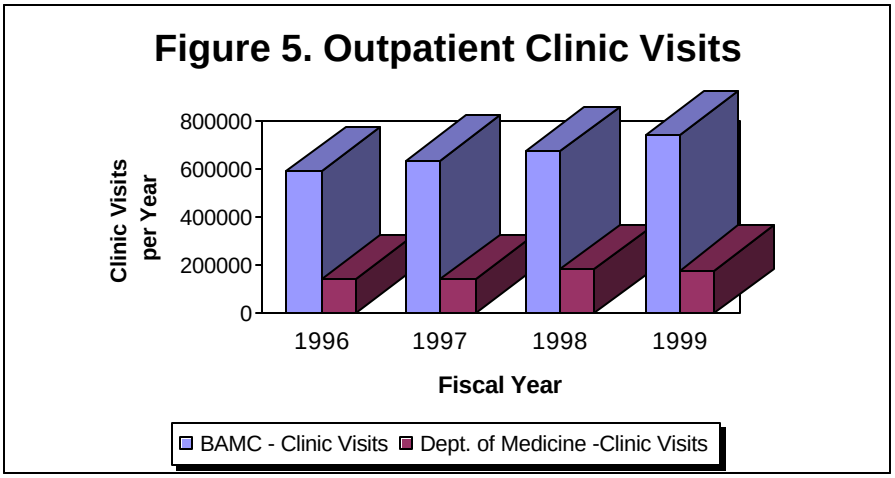


Source: MEPRS



Source: MEPRS

In contrast, outpatient workload, measured in clinic visits, has steadily increased between 1996 and 1999 for BAMC (26%), the Department of Medicine (26%), and the Internal Medicine Clinic (36%) between 1996 and 1999 (MEPRS, 1999).

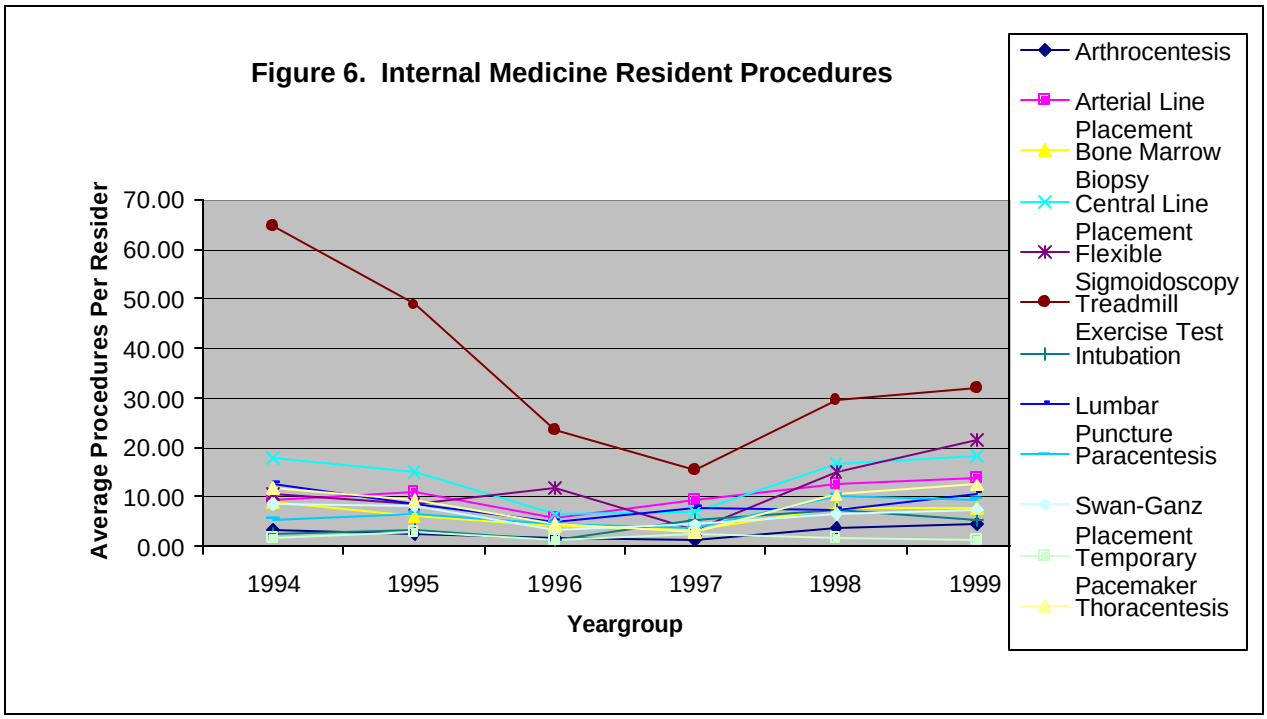


Source: MEPRS

Educational Productivity Data

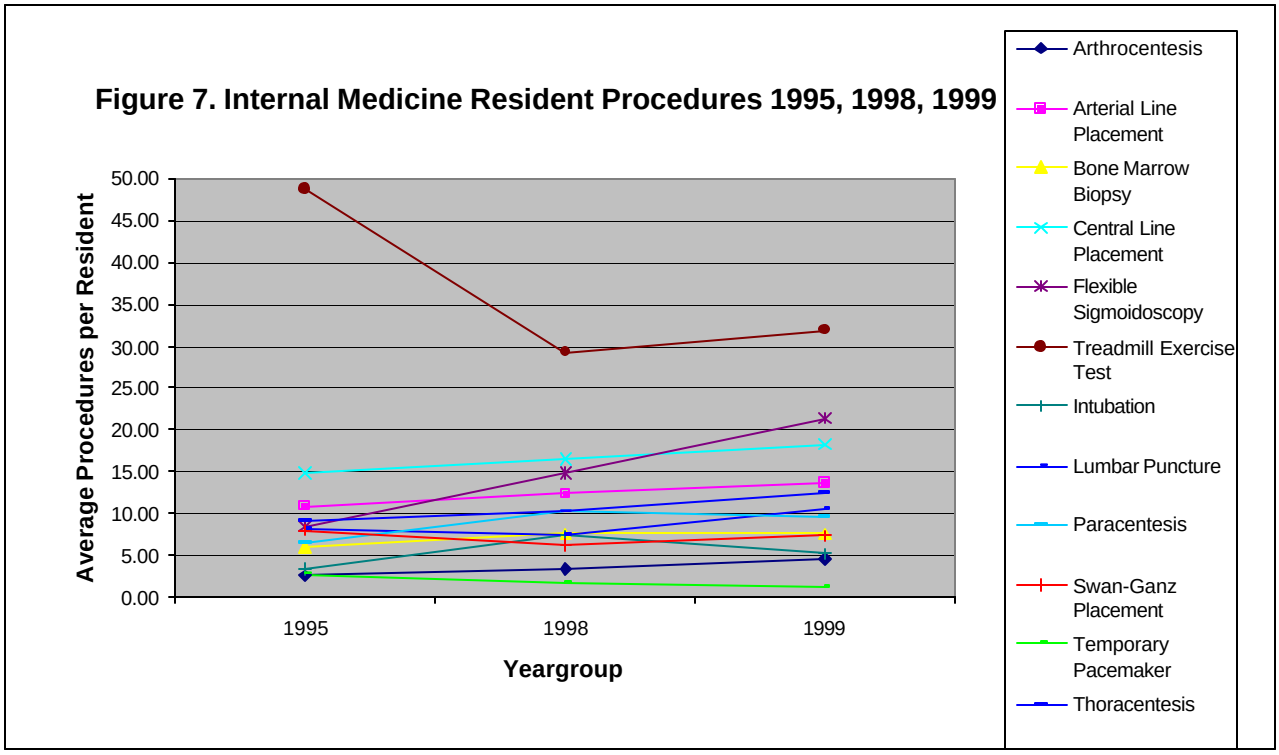
As discussed in the methods section, all procedure data were reported by graduating class. For example, data reported for 1994 reflects procedures performed by the class of 1994 and includes procedures performed during three academic years: 1991-1992, 1992-1993, and 1993-1994. The charts presented here reflect the average number of procedures for each graduating class. The source referred to as the Final Procedure Database contains data entered from individual procedure sheets, department historical database printouts, and the chief resident's spreadsheet as described previously.

a. Procedure Data. Visual inspection of procedure annual averages revealed a general decrease in the number of internal medicine procedures performed in 1996 and 1997, increasing again in 1998 and 1999.



Source: Final Procedure Database

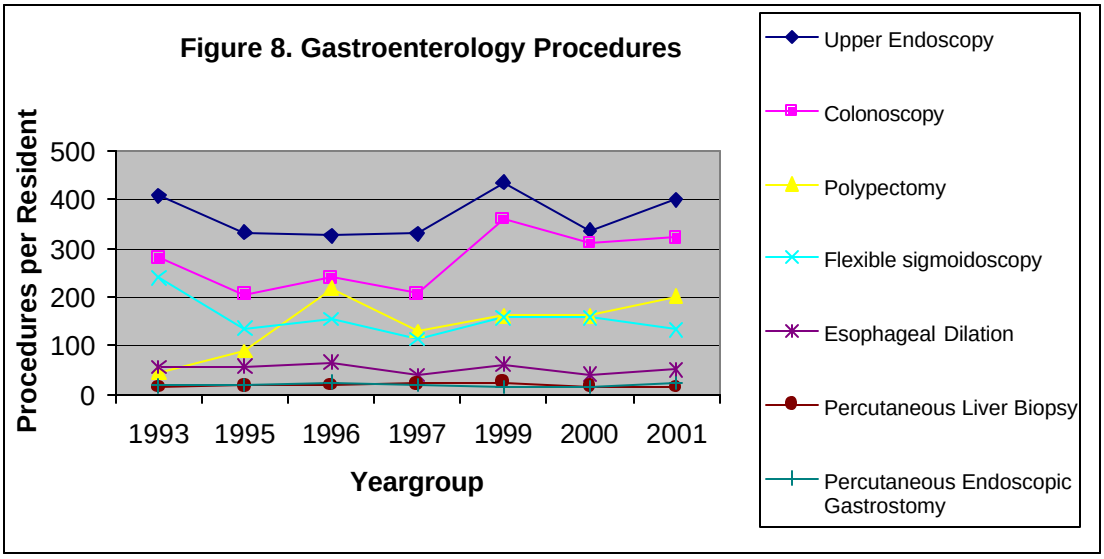
Analysis of variance for all years revealed a significant difference between annual means for eight out of twelve procedures (see Appendix C for means and p values). The overall mean value for all procedures met or exceeded American Board of Internal Medicine requirements when rounded to the nearest whole number.



Source: Final Procedure Database

As discussed in the method and procedures section, analysis of variance was also performed for each procedure to determine if there were significant differences among the selected Pre-TRICARE (1995), TRICARE (1998), and TRICARE Senior Prime (1999) years. Comparison of these three timeframes identified a significant difference in the mean of only two of the twelve procedures: flexible sigmoidoscopy (p=0.027) and

treadmill exercise test (p=0.008). There was a slight increase in the mean for eight out of twelve procedures between the Pre-TRICARE and TRICARE years and a further increase in the mean of nine out of twelve procedures between TRICARE and TRICARE Senior Prime. Only in the TRICARE and TRICARE Senior Prime years did the means for all procedures exceed the number required by the American Board of Internal Medicine.



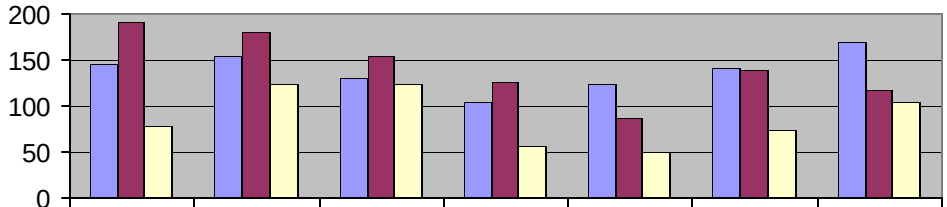
Source: Final Procedure Database

Visual inspection of gastroenterology fellowship procedure data shows fairly consistent averages from 1993 through the projected values for the class of 2001. Slight increases are visible in the number of colonoscopies and polypectomies beginning in 1997. The one-way analysis of variance (ANOVA) for gastroenterology procedure data identified significant changes for two procedures (flexible sigmoidoscopy, p=0.022 and esophageal dilation, p=0.003) when comparing data all years between 1994 and 1999. The mean for both procedures is higher in 1999 than it was in 1995. The overall mean for six out of seven tracked procedures exceeded the required number. The mean for

only one procedure, percutaneous liver biopsy, consistently fell below the required number. Due to a change in program requirements from three to two years, there was no graduating class in 1998. Therefore, 1997 data were used as the established TRICARE year rather than 1998. Analysis of variance showed significant differences in the means of three of seven tracked procedures when comparing the Pre-TRICARE, TRICARE, and TRICARE Senior Prime years. For two out of three of the procedures with significant differences, the mean actually increased each year (See procedure tables, Appendix C). For the third procedure, the mean dropped in the first TRICARE year, but increased again in during the first year of TRICARE Senior Prime.

b. Research, Publications and Presentations Data. The overall number of publications for BAMC has increased since the early 90s. In fact, since the last pre-managed care year (1995), publications have increased 29% from 131 to 169 per year. In contrast, the overall numbers of presentations and abstracts for BAMC have decreased 25% and 15%, respectively, between Pre-TRICARE and TRICARE Senior Prime years (Clinical Investigation, 1993-1999).

Figure 9. BAMC Research Products FY93-FY99



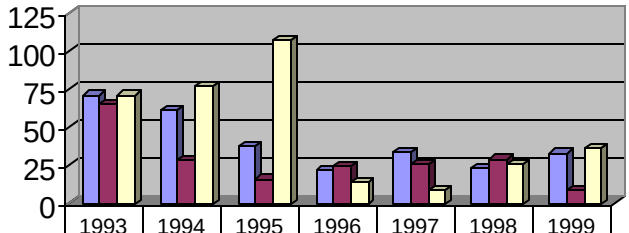
	1993	1994	1995	1996	1997	1998	1999
Publications	145	155	131	105	123	142	169
Presentations	191	181	155	127	87	139	117
Abstracts	78	125	123	56	49	75	105

Fiscal Year

Source: Clinical Investigations Annual Reports

The Department of Medicine publications, presentations, and abstracts have decreased between 1993 and the present. Visual inspection of the data reveals a substantial decrease in research products after 1995, with a slow increase from 1996 to the present.

Figure 10. Department of Medicine Research Products FY93-FY99

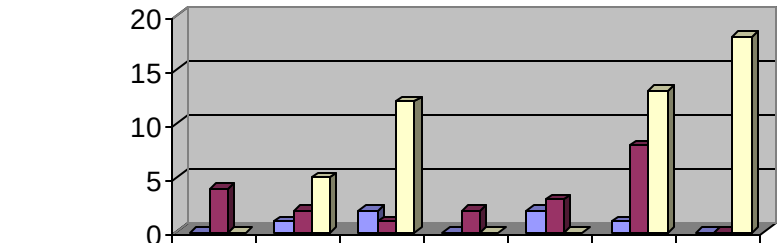


	1993	1994	1995	1996	1997	1998	1999
Publications	71	61	38	22	34	23	33
Presentations	65	28	16	25	26	29	9
Abstracts	71	77	107	14	9	26	36

Source: Clinical Investigations Annual Reports

The Internal Medicine Residency Program staff observed several years ago that research by residents was on the decline. The staff took a proactive approach to increase research and presentations by revising the Internal Medicine Residency Program requirements in 1994. Revisions included a mandatory research project, two months of dedicated research time, award recognition, additional training and administrative support to assist residents in preparing their research and presentations. Although the overall number of Department of Medicine research products has decreased since 1994, the research contribution from the residents has increased tremendously.

Figure 11. Internal Medicine Research Products FY93-FY99



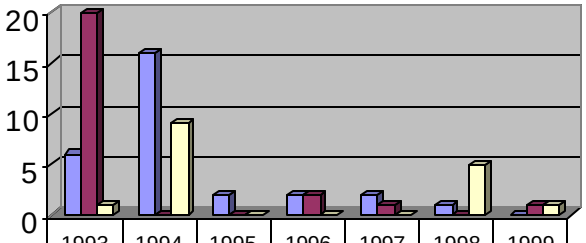
	1993	1994	1995	1996	1997	1998	1999
Publications	0	1	2	0	2	1	0
Presentations	4	2	1	2	3	8	0
Abstracts	0	5	12	0	0	13	18

Source: Clinical Investigations Annual Reports

Between 1997 and 1999, the vast majority (90%) of the internal medicine residents presented their research at a professional meeting. During the same timeframe, the presentation percentage for the BAMC internal medicine residents at regional or nation presentations (37%) was higher than the national average for university-based programs (18%) and for community-based programs (24%) (Hepburn, Enzenauer, Salzberg, Murphy, Parisek, and Battafarano, 2000).

Subspecialty research in the Department of Medicine has declined in recent years. For example, the numbers of gastroenterology publications, presentations, and abstracts have all decreased dramatically since 1994 (Clinical Investigation, 1993-1994).

Figure 12. Gastroenterology Research Products FY93-FY99



	1993	1994	1995	1996	1997	1998	1999
Publications	6	16	2	2	2	1	0
Presentations	20	0	0	2	1	0	1
Abstracts	1	9	0	0	0	5	1

Source: Clinical Investigations Annual Reports

c. Board Pass Rates. The three-year national average, first time pass rate for the American Board of Internal Medicine Certification Exam is 84%. Military organizations performed slightly better than the national average, with an average first time pass rate of 91%. The BAMC Residency Program also performed above the national average with 89% first time passes (ABIM, 2000). However, the BAMC pass rate dropped from 100% in 1995 to 96% in 1996 and hit at low of 78% in 1997. The rate has increased over the last to years to 89% in 1998 and 92% in 1999 (Department of Medicine, 2000).

Discussion and Interpretation of Results

This research study has shown that the implementation of TRICARE has not resulted in a significant change in the average number of procedures performed per internal medicine resident. Analysis clearly demonstrated that, with few exceptions, both BAMC internal medicine residents and gastroenterology fellows performed just as many procedures in a managed care environment as they did prior to the implementation of TRICARE and TRICARE Senior Prime. Many of the annual averages of the number of procedures performed showed a decline in the 1996 and 1997 data. This decline may be partially due to TRICARE implementation, but it is more likely a reflection of poor record keeping during the hospital's move into a new facility in 1996.

Although there was no significant difference for most procedures between Pre-TRICARE, TRICARE and TRICARE Senior Prime years, a few procedures were found to have statistically significant differences between years. The two procedures showing significant differences in the numbers of times they were performed were the treadmill exercise test and flexible sigmoidoscopy. The significant changes in treadmill exercise tests are most likely due to poor record keeping. Anecdotal information claims that the residents perform so many of these procedures that they often stop documenting the treadmill tests after reaching a certain point. Regardless, the decline is not a concern because the annual documented average for the last few years has been approximately three times the number required by the curriculum. Also, the treadmill exercise test is not a procedure required for certification by the American Board of Internal Medicine. Flexible sigmoidoscopies showed a steady increase each year after 1995. This is not

surprising for a diagnostic procedure that would logically increase in demand as beneficiaries over 65 years of age enrolled in TRICARE Senior Prime.

The flexible sigmoidoscopy was also one of two gastroenterology procedures with statistically significant different means among years. This supports the finding from the resident flexible sigmoidoscopy data and is again a positive sign showing increased preventive care workload. The gastroenterology annual mean for flexible sigmoidoscopies for the past few years has been approximately ten times the number required by the curriculum.

In contrast to the residency procedure data, the gastroenterology subspecialty procedure data showed that means for the majority of procedures either decreased or remained the same in 1997. However, they began to increase again in 1999 with the implementation of TRICARE Senior Prime. The majority of these required procedures are reaching annual means of two to ten times the required number. Again, most of the increases are seen in screening and preventive procedures such as colonoscopy, upper endoscopy, and polypectomy. Two subspecialty procedures, on the other hand, esophageal dilation and percutaneous liver biopsy, displayed means below the required number for two or more years. Although a statistically significant difference was not found among years, the values were consistently low and must be monitored closely in future years.

The implementation of TRICARE and TRICARE Senior Prime has increased the BAMC staff's focus on prevention and on their responsibility to provide a continuum of care to enrolled beneficiaries. This increased focus on primary care has had a positive influence on the procedure workload for internal medicine because it is a primary care

service. As the number of TRICARE enrollees continues to increase, the workload for the internal medicine staff will increase, so residents will continue to have plenty of opportunities to perform required procedures. Unfortunately, additional enrollees will also bring increased pressures for primary care providers to see more patients per day. This productivity measure translates to shorter appointment times and additional efforts to increase efficiencies. It is likely that teaching, an inherently time-intensive and inefficient process, will suffer unless provided for in enrollment and productivity calculations. The more these productivity measures are emphasized without GME as part of the equation, the more GME will be at risk.

Staff physicians already feel that there is decreasing time available for teaching because the requirements for clinical productivity, administrative tasks, and military-specific duties have all increased in recent years. Their personal observations are a qualitative measure of change in the educational environment and are a much more sensitive measure than any of the objective data analyzed for this study. If the current trend continues it will only be a matter of time before the decreased educational outputs are measurable. Staff members also expressed in interviews that they have less time available for research. This observation is supported by the demonstrated decrease in research products by BAMC overall as well as the Department of Medicine and Gastroenterology Service. Only the programs that have placed special emphasis on research, areas such as the Internal Medicine Residency Program, have managed to increase research productivity during the last few years.

Many additional factors will continue to affect BAMC's clinical workload, budget, staffing, and therefore, GME programs. Some of these factors include continued

downsizing, increased operational tempo and increased likelihood of deployments, tighter budgets, capitation incentives, the increasing cost of healthcare, and changing patient demographics. Just as the civilian population is aging, so are BAMC's beneficiaries. Between 1995 and 1999, the number of BAMC-eligible beneficiaries over 65 years of age increased 12% from 9,549 to 10,678. They are projected to continue to increase, another 20% by the year 2006 to 12,817 (Managed Care Forecasting and Analysis System, 2000). Also, as the Army downsizes, there are fewer medical treatment facilities to refer patients to medical centers like BAMC. There will also be fewer GME programs at each facility and difficult decisions will need to be made on where to spend scarce resources. These factors are all additional reasons why it will become increasingly necessary to closely monitor all military programs, especially GME. Each facility should have objective data to actively evaluate all current programs and to show educational value added.

Conclusions and Recommendations

TRICARE has impacted the Internal Medicine Residency Program at Brooke Army Medical Center in many ways, both positive and negative. As measured by the number of procedures performed and by board pass rates, the residency program has maintained an extremely successful record during the implementation of TRICARE and TRICARE Senior Prime. Since these are arguably the two most critical measures of training success, one must conclude that managed care has had a positive influence on our internal medicine GME. TRICARE has contributed to the internal medicine workload in a way that has helped residents maintain and exceed the requirements for procedure

training. This managed care environment has also supported an educational experience that enables residents to exceed national test averages. However, as measured by decreasing research products and available inpatient workload, the environment for training and education is becoming more constrained. These, too, are critical aspects of GME, but are beginning to suffer. Since training and education are not goals directly aligned with managed care, they have taken a back seat to recent efforts that focus on productivity in primary care. Decreases in research and inpatient workload signal a decrease in the overall quality of medical education programs and may be a warning sign of more serious problems to come. Therefore, BAMC must ensure that measures are in place not only to be productive and succeed in TRICARE, but also to maintain the levels of research and inpatient training required for high quality GME.

The following recommendations are offered for consideration:

1. **Improve Documentation and Information Systems.** A recent report by the Council on Medical Education discussed the program director's responsibility to document a resident physician's specific experiences and demonstrated skills. It stated that physicians are increasingly required to document their qualifications for clinical practice, e.g., by the completion of a given number of procedures (Daugherty, R. M., 1999). Policies should be in place to ensure that this documentation is comprehensive, accurate, and a part of the permanent record so it can be retrieved if needed. In the short term, more strict and better-defined policies for documenting procedures should be enforced so we have more complete records that accurately reflect the educational procedures performed. Data should be legible, if not typed. This would be very easy to do with a simple computer spreadsheet, with an Access database, or with any number of handheld

devices. Discussions in the literature show the importance of documenting residency procedures for internal medicine training (Wartman, 1994 and Dire & Kietzman, 1995). Various other residency programs' efforts to improve their documentation process range from manual entries in booklets, later entered into a web-based computer database (Duff & Snyder, 1997), to handheld computer data entry (Garvin, Otto, & McRae, 2000). This type of database has been maintained at various points for Department of Medicine GME, however, the effort has not been consistent. A procedure database is now being maintained for gastroenterology residents and staff. This is a service level effort that provides valuable documentation for all physicians involved. For the long term, this capability should be built into our facility-wide information systems so it is automatically documented and does not consume physicians' valuable time. Regardless of the method chosen for documentation, program directors must have objective data to routinely evaluate trends and make proactive decisions rather than reactive adjustments. Improved documentation and objective data will be valuable tools in evaluating and improving all medical education programs.

2. Improve GME Visibility. GME data should not only be tracked more closely at the department and service levels, but also at public forums such as the BAMC Monthly Management Review. A single GME slide was generated months ago, but it has only recently been populated with data. Rather than taking advantage of a golden opportunity to publicly discuss GME issues, the lack of attention implies that GME is not as important as other items addressed in great detail. If more educational metrics were tracked and discussed in a management forum, the programs would gain more visibility and might receive critical support before issues become problems. Metrics should include

objective measures such as procedures performed and research produced. Visibility of the GME committee and the committee's interaction with other BAMC staff members should also be improved. Some monitoring and evaluation of objective data should be performed by the GME committee on a routine basis and should be shared with the program directors and department chiefs. This approach will wisely use the "Hawthorne Effect" because processes that are watched are likely to improve. By monitoring key areas, productivity will increase. Because GME is not monitored now to the extent clinical productivity is, less time is being spent teaching and the staff and students perceive a decreased importance in GME, compared to other issues and areas that receive more attention.

3. **Encourage Resident Research.** Implement a more widespread research emphasis in BAMC's residency programs to expand on the Internal Medicine Residency Program's successful research initiative. One of the most critical elements of this department level program was granting two months of research time to the residents. A national survey of internal medicine program directors found that lack of resident time was the most frequently cited barrier to resident research (Alguire, Anderson, Albrecht, & Poland, 1996). Ideally, this strategy should be incorporated into all possible residency curriculums. Granting research time may not be practical for staff physicians, but it should be encouraged as workload allows. The 1999 Council on Medical Education report recommends that both residents and full-time faculty members engage in scholarly activities through "research, participation in scholarly meetings, journal clubs, lectures, and similar academic pursuits" (Council on Medical Education, 1999).

4. **Continually Evaluate and Update Curriculum.** Continually update residency curriculums to emphasize disciplines that are important in contemporary medical practice. For internal medicine, current issues include primary care "best practices", capitation, resource management, population health, evidence-based medicine, geriatric care. These current topics should be integrated into training to produce the most well rounded and well-prepared primary care physicians possible. Providing this training will also help staff physicians maintain knowledge of current issues. Many civilian publications are encouraging programs to provide residents more training in business areas like capitation and risk management (Council on Graduate Medical Education, 1999). Military residents also need to understand such current issues to effectively perform their duties in today's military managed care environment.

5. **Evaluate Surgical and Subspecialty Training Programs.** Support and encourage similar research to collect objective data and further evaluate surgical and subspecialty GME programs. This information would be a valuable tool for program directors to use in monitoring and evaluating their programs. It would also assist leadership in making informed decisions about maintaining necessary and appropriate GME. BAMC's needs for certain subspecialties may change as the healthcare environment and patient population change. For example, if managed care's focus on preventive care successfully leads to a healthier and more informed patient population, future requirements for primary care physicians may continue to increase while requirements for some subspecialties may decrease. To maintain a strong GME program, it must be monitored and continually re-designed to best reflect the current needs of the population.

6. **Monitor Space Available Consults.** Use the space-available workload and the consultation system wisely to ensure that the required number of subspecialty procedures is consistently captured to support GME. Selectively accepting procedures for space available work raises an ethical issue for some because it can be interpreted as not providing equal care to all beneficiaries. However, to maximize educational value, subspecialty clinics need to be actively involved in the consultation screening process, and they need to prioritize workload. To maintain successful fellowships, subspecialty programs need to maintain the flexibility of some space-available capacity or training in certain procedures at nearby civilian, academic medical centers.

7. Actively Market to the Retiree Population. Marketing to beneficiaries who currently rely on space-available care will become increasingly important to GME. Space-available care, by definition, is provided to beneficiaries who are not TRICARE Prime or TRICARE Senior Prime. In 1999, 33% of subspecialty clinic outpatient visits at BAMC were space-available (Department of Health Plans Management, 2000). If funding and staff shortages cause this space-available appointment space to be reduced, this could result in up to 33% fewer procedures performed in the subspecialty clinics. A change of that magnitude would drop the number of procedures performed below the quotas in many instances. The ideal solution is to maintain the workload by converting the space-available beneficiaries to enrolled patients. If our enrolled patient population cannot support sufficient procedure workload, management has a difficult decision to make. It must choose between arranging for additional procedure training at another local training hospital, reducing the program size, or eliminating that subspecialty training at this facility. If successful, marketing to the local non-enrolled retiree

population will achieve three important objectives. First, it would enable BAMC to provide better care to a group of beneficiaries that we cannot fully support now. Second, it would expand our patient population to better support our GME programs. Third, it would provide a larger enrolled population for which the facility would receive capitated financial support.

8. **Maintain Balance.** Above all, maintain a healthy balance between our immediate patient care mission and our education mission. We have both a responsibility to manage the care of our beneficiary population and to maintain robust GME that will ensure an adequate number of well trained military physicians for the future. The quality of our education and our patient care are interdependent and must be conducted in such a way that they enhance one another.

References

Alguire, P.C., Anderson, W.A., Albrecht, R. R., Poland, G.A., (1996). Resident Research in Internal Medicine Training Programs. Annals of Internal Medicine 124 (3): 321-8.

American Board of Internal Medicine. (2000). 1996-1998 Three Year Pass Rate for ACGME Accredited Programs. Retrieved May 24, 2000 from the World Wide Web: http://www.abim.org/info/ppr.htm

American Hospital Association. (1997). Statement of the American Hospital Association Before the Committee on Finance of the U.S. Senate on Graduate Medical Education. Retrieved October 25, 1999 from the World Wide Web: http://www.aha.org/ar/fin_gme.html

American Medical Association. (1999). Graduate Medical Education Directory 1999-2000: Section II Essentials of Accredited Residencies in Graduate Medical Education: Institutional and Program Requirements.p.25

Blanck, R. R. (1997). Surgeon General Reaffirms Commitment to Quality Healthcare for Army's People. Retrieved September 27, 1999 from the World Wide Web:http://dtic.mil:80/cgi-bin/multiga...;esn=FT%5fTEXT%20HTML%200;ct=text/html

Bolognia, J. L., Wintroub, B. U. (1996). The Impact of Managed Care on Graduate Medical Education and Academic Medical Centers. Archives of Dermatology, 132(9): 1078-1084.

Booz Allen & Hamilton (1998). AMEDD Maximally Efficient Staffing Study.

Brink, S. (1997). America's Best Hospitals. U.S. News and World Report. 28 July, 1997

Brooke, P. P., Hudak, R. P., & Finstuen, K (1994). Product-Line Evaluation of Graduate Medical Education Program Costs. Hospital and Health Services Administration 39:2, 265-278.

Brooke Army Medical Center, Public Affairs Office. (1999). BAMC Fact Sheet

Burkhalter, E. L. (1996). Graduate Medical Education in the Department of Defense. Military Medicine, 161(2), 102-104.

Cooper, D. R, & Schindler, P. S. (1998). Business Research Methods (6th ed.). Boston: Irwin-McGraw-Hill.

Council on Graduate Medical Education, (1999). Thirteenth Council on Graduate Medical Education Report: Physician Education for a Changing Health Care Environment. March 1999.

Daugherty, R. M., (1999). Principles for Graduate Medical Education. Council on Medical Education Report 9-A-99 for the American Medical Association. Retrieved June 1, 2000 from the World Wide Web: www.ama-assn.org/meetings/public/annual99/reports/cmerpts/rtf/cmerpt9.rtf

Department of Defense, Office of the Inspector General. (1996). DoD Graduate Medical Education Programs And Medical Readiness Training (Report No. 96-168).

Department of Defense, Assistant Secretary of Defense (Health Affairs). (1999). Department of Defense Glossary of Healthcare Terminology (DoD 6015.1-M). Washington, D.C.. Retrieved October 27, 1999 from the World Wide Web: http://web7whs.osd.mil/html/60151m.thm

Department of Defense, Assistant Secretary of Defense (Health Affairs), Assistant Secretary of Defense (Force Management and Personnel), and Comptroller of the Department of Defense. (1991). Medical Expense Performance and Reporting System for Fixed Military Medial and Dental Treatment Facilities (DoD 6010.13-M). Washington, D.C..

Department of Defense, Assistant Secretary of Defense (Health Affairs). (1994). Policy Guidelines for Implementing Managed Care Reforms in the Military Health System.

Department of Defense, Assistant Secretary of Defense (Health Affairs). (1998). Strategic Thinking Assumptions: Health Affairs and the Military Health Services System (MHSS). Retrieved October 27, 1999 from the World Wide Web: http://www.tricare.osd.mil/planning/strategic/assump.html

Department of Defense, Assistant Secretary of Defense (Health Affairs). (1999). TRICARE Management Agency TEC Minutes.

Department of Defense, Office of the Inspector General. (1997). Audit Report: Reporting Graduate Medical Education Costs (Report No. 97-147).

Department of Medicine, Internal Medicine Residency Program. (1999). Curriculum, Internal Medicine Residency.

Department of Medicine, Gastroenterology Fellowship Program. (1999). Curriculum, Gastroenterology Fellowship.

Dire, D. J., Kietzman, L. I., (1995). A Prospective Survey of Procedures Performed by Emergency Medicine Residents During a 36 Month Residency. Journal of Emergency Medicine. 13(6), 831.

Duff, P., Snyder, M., (1997). Statistics for the Residency Review Committee: A Clear Windows Approach. Obstetric Gynecology. 89(6).

Dunn, M. R., Miller, R. S., Richter, T. H. (1998). Graduate Medical Education, 1997-1998. Journal of the American Medical Association, 290(9), 809.

Gapenski, L. (1996). Understanding Health Care Financial Management (2 ed.). Chicago: Health Administration Press/Association of University programs in Health Administration.

Garvin, R., Otto, F., & McRae, D. (2000). Using Handheld Computers to Document Family Practice Resident Procedure Experience. Family Medicine, 32(2), 115.

Gillert, D. J. (1996). Graduate Education Bolsters Military Health Care. American Forces Press Service. Retrieved October 25, 1999 from the World Wide Web: http://www.defenselink.mil/news/Jan1997/n01161997_9701164.html

Grimaldi, P. L. (1998). Managed Care May Crunch GME Programs. Nursing Management, 29(2), 14.

Hepburn, M. J., Enzenauer, R. J., Salzberg, D. J., Murphy, F. T., Parisek, R. A., & Battafarano, D. F. (2000). The Impact of an ACP Associates' Meeting on Internal Medicine Resident Research, pending publication.

Howard, R. J. (1994). May You Live in Interesting Times: Academic Medical Centers, Academic Societies, and the Coming Dominance of Government and Business in American Medicine. Arch Surg.,129, 1123-1130.

Huntsinger, C. R., & Rubenstein, D.A. (1999). Academic Medical Centers: A Prescription for Success in an Era of Managed Care and Capitation. Military Medicine, 164(8), 585-589.

Inglehart, J. K. (1993). The American Health Care System –Teaching Hospitals [Health Policy Report]. The New England Journal of Medicine, 329(14): 1052-1056.

Kongstvedt, P. (1997). Essentials of Managed Health Care (2nd ed.). Gaithersburg, Maryland: Aspen Publishers, Inc.

Kuttner, R. (1999). Managed Care and Medical Education. The New England Journal of Medicine, 341(14):1092-1096.

Ludmerer, K. M. (1999). A Time to Heal: American Medical Education From the Turn of the Century to the Era of Managed Care. New York: Oxford University Press.

Mechanic, R., Coleman, K., & Dobson, A. (1998). Teaching Hospital Costs: Implications for Academic Missions in a Competitive Market [Policy Perspectives]. The Journal of the American Medical Association, 280(11), 1015-1019.

Newhouse, J. (1993). Free for All? Lessons from RAND Health Insurance Experiment Group. Cambridge: Harvard University Press.

Managed Care Forecasting and Analysis System. (2000). Ad Hoc Report

McGaha, J. F. (1997). Medical Readiness Training, Retention, and Cost Efficiency: The future of DoD's Graduate Medical Education Program. Carlisle Barracks, Pennsylvania: U.S. Army War College.

McNeill, G. (1994). A Non-Traditional Methodology for Determining the Cost of Graduate Medical Education Within the Army Medical Department. San Antonio, Texas: Baylor University.

Michels, R. (1999). Medical Education and Managed Care. The New England Journal of Medicine, 340 (12), 959-961.

Miller, R. S., Dunn, M. R., & Richter, T. (1999). Graduate Medical Education 1998-1999: A Closer Look. The Journal of the American Medical Association, 282(9), 855-860.

Rosenthal, G.E. (1997). Teaching Hospitals Have Better Outcomes. The Journal of the American Medical Association, 278(6), 485-90.

Salerno, S., Cash, B., Cranston, M., & Schoomaker, E. (1998). Perceptions of Current and Recent Military Internal Medicine Residents on Operational Medicine, Managed Care, Graduate Medical Education, and Continued Military Service. Military Medicine, 163(6), 392.

Simon, S. R., Pan, R. J., Sullivan, A. M., Clark-Chiarelli, N., Connely, M. T., Peters, A. S., Singer, J. D., Inui, T. S., & Block, S. D. (1999). Views of Managed Care: A Survey of Students, Residents, Faculty and Deans at Medical Schools in the United States. The New England Journal of Medicine, 340(12), 928-961.

United States Congress. (1999). National Bipartisan Commission on the Future of Medicare Meeting Transcript. Retrieved October 25, 1999 from the World Wide Web: http://rs9.loc.gov/medicare/trans81098.html

United States House of Representatives, Committee on Ways and Means, Subcommittee on Health. (1997, March). Teaching Hospitals and Medicare Disproportionate Share Hospital Payments (Hearing 43-165CC). Retrieved October 25,

1999 from the World Wide Web:
http://commdocs.house.gov/committees/ways/hwmw105-7.000/hwmw105-7_0.htm

Wartman, S. A., (1994). Managed Care and Its Effect on Residency Training in Internal Medicine. Archives of Internal Medicine (154), 2539.

APPENDIX A
GLOSSARY OF TERMS AND ACRONYMS

Accreditation* - Graduate medical programs are accredited when they are judged to be in substantial compliance with the *Essentials of Accredited Residencies in Graduate Medical Education*. The *Essentials* consist of (a) the Institutional Requirements, which are prepared by the ACGME, approved by its sponsoring organizations, and apply to all programs, and (b) the Program Requirements, which are prepared by a review committee for its area(s) of competence and approved by the ACGME.

Abstract - A short summary of a professional publication or research presented at a national professional meeting.

ACGME* (The Accreditation Council for Graduate Medical Education) – a council that jointly sponsored by the American Board of Medical Specialties, the American Hospital Association, the American Medical Association, the Association of American Medical Colleges, and the Council of Medical Specialty Societies. The mission of the ACGME is to improve the quality of health in the United States by ensuring and improving the quality of graduate medical education experience for physicians in training. The ACGME establishes national standards for GME by which it approves and continually assesses educational programs under its aegis.

CHCS (Composite Health Care System) – The clinical workload system used in most military treatment facilities.

Disposition – The removal of a patient (including live births) from the census of a hospital by reason of discharge to duty, to home, transfer to another medical facility, death, or other termination of inpatient care (DoD 6015.1-M).

Fellow* – Participants in subspecialty GME programs. Note: The *Graduate Medical Education Directory* and the ACGME use the term "resident" to designate all GME participants in ACGME-accredited programs.

GME (Graduate Medical Education) – Full-time, structured, medically related training accredited by a national body (i.e. the Accreditation Council for Graduate Medical Education), approved by the commissioner of education, and obtained after receipt of the appropriate doctoral degree (MEPRS, 1999).

Intern* – Historically, "intern" was used to designate individuals in the first year of GME. Since 1975 the *Graduate Medical Education Directory* and the ACGME have not used the term, instead referring to individuals in their first year of GME as residents.

MEDCEN (Medical Center) – A large hospital, which has been so designated and appropriately staffed and equipped to provide a broad range of healthcare services, serves as a referral center with specialized and consultative supports for medical facilities within the geographic area of responsibility. Conducts, as a minimum, a surgical graduate medical education program (MEPRS, 1999).

MTF (Military Treatment Facility) – A military medical center, hospital, clinic, or other facility that provides medical, surgical, or dental care (DoD 6015.1-M).

MEPRS (Military Expense Performance Reporting System) – A military data system that records manpower, performance and expense data for fixed facilities.

Occupied Bed Day (Also called census bed days.) - The total number of beds occupied at the census taking hour for a specified period; this number excludes live births (DoD 6015.1-M).

Outpatient Clinic Visit - Healthcare characterized by the professional examination and/or evaluation of a patient and the delivery or prescription of a care regimen (DoD 6015.1-M).

PCM (Primary Care Manager) – A physician who is responsible (often financially and also clinically) for the care received by specific individuals in a managed care organization or other integrated health system. The primary care manager moves the person throughout the provider network, and patients cannot see specialist physicians without a referral from their PCM (DoD 6015.1-M January 1999).

Resident* – A physician at any level of GME in a program accredited by the ACGME. Participants in accredited subspecialty programs are specifically included.

RRC* (Residency Review Committee) – The RRC carries out the accreditation of GME programs under the aegis of the ACGME. A Residency Review Committee (RRC) consists of representatives appointed by the American medical Association, the appropriate specialty board, and, in some cases, a national specialty organization.

Scholarly Activity* – Educational experiences that include active participation of the teaching staff in clinical discussions, rounds, and conferences in a manner that promotes a spirit of inquiry and scholarship; active participation in journal clubs, research conferences, regional or national professional and scientific societies, particularly through presentations at the organizations' meetings and publications in their journals; participation in research, particularly in projects that are funded following peer review and/or result in publications or presentations at regional and national scientific meetings; offering of guidance and technical support, e.g., research design, statistical analysis, for residents involved in research; and provision of support for resident participation as appropriate in scholarly activities. It may be defined in more detail in specific Program Requirements.

TRICARE (Tri-Service Health Care) - This is the managed care program for the military services, implemented at Brooke Army Medical Center beginning in November 1995 (DoD 6015.1-M).

** From a Glossary of Selected Terms Used in GME Accreditation, AMA Graduate Medical Education Directory 1999-2000*

APPENDIX B
DESCRIPTIONS OF MEDICAL PROCEDURES

INTERNAL MEDICINE REQUIRED PROCEDURES:

Arterial Puncture for Blood Gas Analysis: Inserting a needle into an artery to withdraw arterial blood for analysis of critical gases in the blood

Arterial Line Placement: Placing a catheter into an artery to measure continuous arterial pressures and/or to withdraw arterial blood

Abdominal Paracentesis: Drawing off excess fluid from the abdomen through a hollow needle for therapeutic or diagnostic purposes

Arthrocentesis: Inserting a hollow needle into a joint cavity to withdraw fluid for diagnostic purposes

Thoracentesis: Inserting a hollow needle through the chest wall and into the pleural cavity to withdraw fluid, blood, pus, or air for therapeutic or diagnostic purposes

Central Line (Central Venous Catheter) Placement: Placing a catheter into the superior vena cava to infuse fluids and to take diagnostic recordings of the right side of the heart

Lumbar Puncture: Inserting a hollow needle into the subarachnoid space in the lower back to withdraw cerebro-spinal fluid for diagnostic or therapeutic purposes

Swan Ganz Catheter Placement: Inserting a catheter with an inflatable balloon at its tip into the pulmonary artery via the right chambers of the heart to measure pulmonary artery pressure

Treadmill Exercise Test: Conducting a graduated exercise test on a treadmill while monitoring the rate and rhythm of the heartbeat

Endotracheal Intubation: Introducing a tube into the trachea for the purpose of ventilating the lungs

Nasogastric Intubation: Passing a tube through the nose into the stomach to introduce or remove stomach contents

- www.abim.org/about/p&p.htm#7

INTERNAL MEDICINE ENCOURAGED PROCEDURES:

Bone Marrow Aspiration & Biopsy: Inserting a needle into a bone to withdraw bone marrow and/or bone for diagnostic purposes

Flexible Sigmoidoscopy: Inserting a flexible scope into the rectum and sigmoid colon for diagnostic purposes

Temporary Transvenous Pacemaker Placement: Placing a battery-operated, non-permanent electrode into the heart via a central line to control a patient's heart rate

GASTROENTEROLOGY REQUIRED PROCEDURS:

Proctoscopy and/or flexible sigmoidoscopy: Using a flexible fiberoptic instrument to visually examine the rectum and sigmoid colon for diagnostic and therapeutic purposes

Upper gastrointestinal endoscopy: Using a flexible fiberoptic instrument inserted through the mouth to obtain a view of the esophagus, stomach, and duodenum for diagnostic and therapeutic purposes

Colonoscopy: Using a flexible fiberoptic instrument to examine the interior of the entire colon and rectum; specimens may be obtained for microscopic examination using flexible forceps or polyps removed using a snare

Esophageal Dilation: Using a balloon to open esophageal strictures for therapeutic purposes

Liver Biopsy: Removing tissue from the liver by use of a large-bore needle that permits removal of a core of tissue for diagnostic purposes

Polypectomy: Surgically removing a polyp (a tumor with a pedicle or stem that attaches to new growth)

Percutaneous Endoscopic Gastrostomy (PEG): Inserting a tube directly through the abdomen into the stomach to provide long-term nutritional support in patients unable to swallow

* www.abim.org/about/p&p.htm#7

APPENDIX C
STATISTICAL RESULTS

Table 2. Internal Medicine Procedures

Procedure Name	1994	1995	1996	1997	1998	1999	Mean	Standard Deviation	BAMC Requirement	Board Requirement	Significance All Years
Arthrocentesis	3.50	2.63	1.50	1.33	3.57	4.50	2.94	2.84	1	3	
Arterial Line Placement	9.38	11.00	5.67	9.27	12.50	13.75	10.32	7.03		5	
Bone Marrow Biopsy	8.88	6.20	3.90	3.20	7.60	7.75	6.39	4.19	5		0.42
Central Line Placement	17.88	14.82	6.25	6.75	16.50	18.25	13.09	8.66	10	5	0.001
Flexible Sigmoidoscopy	10.75	8.50	11.75	3.33	14.88	21.38	13.09	9.88	15		0.039
Treadmill Exercise Test	64.50	48.73	23.50	15.29	29.30	31.88	35.52	21.31	10		0.000
Intubation	2.50	3.45	1.29	5.33	7.40	5.29	4.36	6.3	15	3	
Lumbar Puncture	12.63	8.27	5.00	7.86	7.40	10.75	8.34	4.43	5	5	0.002
Paracentesis	5.50	6.60	4.67	3.71	10.20	9.50	6.73	5.07	5	3	0.026
Swan-Ganz Placement	8.50	8.00	3.27	4.33	6.40	7.50	6.33	4.07	5		0.021
Temporary Pacemaker	1.67	2.78	1.33	2.50	1.83	1.33	2	1.25	5		
Thoracentesis	11.75	9.20	4.50	2.88	10.30	12.38	8.3	5.13	5	5	0.000

Table 3. Gastroenterology Procedures

Procedure Name	1993	1995	1996	1997	1999	2000	2001 (projected)	Mean	Standard Deviation	BAMC Requirement	Significance All Years
Upper Endoscopy	408	332	325	331	435	337	399	366.31	51.53	100	
Colonoscopy	280	204	239	207	360	311	322	258.01	64.65	100	
Polypectomy	45	89	217	130	162	162	201	128.52	66.31	20	
Flexible sigmoidoscopy	240	135	154	114	158	158	132	160.16	48.02	25	0.022
Esophageal Dilation	55	56	66	39	61	41	50	55.33	10.34	50	0.003
Percutaneous Liver Biopsy	15	17	19	21	24	16	14	19.23	3.34	20	
Percutaneous Endoscopic Gastrostomy	18	19	24	19	15	15	23	18.90	3.09	10	